7. NATURAL RESOURCES

Arlington's landscape is defined by natural features that influence the location and intensity of development. The lakes and ponds, brooks, wetlands, and protected open spaces provide important public health and ecological benefits and recreational opportunities, too. Activities in Arlington also affect downstream neighbors, so local policies and practices that affect natural resources have regional consequences. This master plan element focuses on irreplaceable land and water resources that must be considered in decisions about where, what, and how much to build as Arlington continues to evolve.

Natural Resources Goals

- *Use sustainable planning and engineering approaches to improve air and water quality, reduce flooding, and enhance ecological diversity by managing our natural resources.*
- *Mitigate and adapt to climate change.*
- *Ensure that Arlington's neighborhoods, commercial areas, and infrastructure are developed in harmony with natural resource concerns.*
- *Value and protect the physical beauty and natural habitats of Arlington.*

A. Topography and Geology

Arlington is one town for political purposes, but it is physically divided by geologic and watershed boundaries that contribute to its varied landscape. Indeed, Arlington's topography is a study in contrast. The west side of town lies within the Coastal Lowlands (also known as the Eastern Plateau), a **physiographic area** that includes large portions of Middlesex County. In the hilly, rocky areas northwest of Arlington Center, elevations range from 100 feet to nearly 400 feet above mean sea level (MSL). Map 7-1 shows that Arlington's highest elevation, Turkey Hill (380 feet), along with Mount Gilboa and Symmes Hill, are all located in this part of town. The Mill Brook flows from west to east through the valley below these hills, and another band of hilly terrain runs along the south and west sides of Arlington. A **watershed divide** that extends into the town's southwest corner, following the contours of an end moraine, effectively directs most of the water that falls on Arlington toward low-lying areas to the east and south. The east side of Arlington lies within the Boston Basin, a physiographic area that encompasses Suffolk County and several towns in Middlesex and Norfolk Counties, bound by shared bedrock characteristics and waterways that discharge into Massachusetts Bay. In Arlington, the Boston Basin consists of the low-lying, relatively flat floodplain bordering the Alewife Brook between Lower Mystic Lake and Spy Pond.[1] Here, elevations range between 10 and 40 feet above (MSL).

Neither topography nor soil conditions have materially affected the amount of development that occurred in Arlington over the past century. As a result, much of the town is covered with impervious surfaces – mainly buildings and pavement – which impede the land's ability to absorb

[1] U.S. Natural Resource Conservation Service (NRCS), *Soil Survey of Middlesex County* (2009), 5-6.

and disperse rainwater. The EPA estimates that impervious surfaces cover 41.4 percent of the town.[2] Arlington's geology affects infiltration, too, for the town has large areas of ledge and rocky soils. Nevertheless, ready access to public water and sewer service has enabled construction in places that would have been unbuildable without these utilities.

B. Soils

Most of Arlington's soils have been disrupted due to the intense development that occurred here over the past century. The U.S. Natural Resource Conservation Service (NRCS) classifies these kinds of soils as **urban land**. In Arlington and virtually all cities and towns in the Greater Boston area, urban land occurs in a **soils complex**, or an intricate mix of two or more soil series, i.e., urban (disturbed) land mixed with soils that still retain their original characteristics. Not surprisingly, the soils found on Arlington's west side differ from those on the east, even though overall, the soils in Arlington consists of varying types of urban land complexes. This is because the parent material – the underlying geologic sources of the undisturbed or native soils – differs as well.

The most common soils complex in Arlington is the Charlton-Hollis-Urban Land Complex, which occurs throughout the west side of town in slopes of 3 to 5 percent. Charlton soils are well-drained, stony, upland soils, while Hollis soils are shallow (less than 20 inches), excessively drained soils on bedrock-controlled hills. The parent material for these soils is primarily glacial till. Charlton soils are generally suitable for both cultivation and development. Another soil type found in the west and northwest sections of town, on slopes of 3 to 15 percent, is the Newport-Urban Land Complex. Newport soils are generally good for lawns and vegetable gardens, but often less-than-desirable for construction because they transmit subsurface water poorly. In Arlington, Newport soils generally make up about half of this soils complex, with urban land accounting for another 40 percent and the rest, an assortment of other soils common to the region.

Table 7-1: Soil Types Found in Arlington

Soil Type	Description	Location in Arlington
Charlton-Hollis-Urban Land Complex	*Charlton Soils*: well-drained, upland soils. Stony, with 60 inches or more of friable fine sandy loam (a silt-sand-clay mixture). *Hollis soils*: shallow (less than 20 inches), excessively drained on bedrock uplands. Friable fine sandy loam.	Western areas on slopes of three to five percent
Newport-Urban Land Complex	*Newport Soils*: found on three to fifteen percent slopes, tends to be silty loam.	West and northwest of Park Circle, east of Turkey Hill, and west of Winchester Country Club
Merrimac-Urban Land Complex	*Merrimac Soils*: excessively drained soils on glacial outwash plains, sandy loams over a loose sand and gravel layer at 18 to 30 inches. Soils contain approximately 75 percent urban land/disturbed soils.	East Arlington
Sandy Udorthents and Udorthents Wet Substratum	*Udorthent Soils*: excavated and/or deposited due to construction operations.	East Arlington by lakes, streams and wet areas
Source: Arlington Open Space and Recreation Plan 2007-2012.		

[2] U.S. Environmental Protection Agency (EPA), Region 1, "Impervious Cover & Watershed Delineation by Subbasin or GWCA Arlington, MA" (March 30, 2010).

The soils in East Arlington include the Merrimac-Urban Land Complex, Udorthents, and Udorthents wet substratum. The Merrimac-Urban Land Complex occurs on slopes of zero to eight percent. Merrimac soils are very well-drained soils found on glacial outwash plains and terraces. They are suitable for construction of homes, businesses, and supporting infrastructure, as well as lawns and gardens. Due to their very high permeability, Merrimac soils are susceptible to drought, but over half of the Merrimac-Urban Land Complex in Arlington consists of urban land. Pockets of Udorthents are found along East Arlington's lakes, streams, and wet areas. Udorthents are highly disturbed soils that have been excavated or deposited by construction operations. They often occur in areas with playing fields, playgrounds, and similar outdoor recreation facilities. Udorthents wet substratum soils occur where flood plains and swamps have been filled, and they are common along the Charles River and Mystic River. Udorthents wet substratum soils are poorly drained and subject to surface ponding after heavy rainfalls.

C. Water Resources

Approximately 226 acres of Arlington's total area (6.4 percent) is covered by surface water, including two lakes, two ponds, one river, three brooks, and one reservoir, as shown in Map 7-2. Most of Arlington is located in the Mystic River watershed, which covers about 76 sq. mi. and includes all or portions of twenty-two communities in the Greater Boston area. All of the surface waters in Arlington directly or indirectly affect the Mystic River, which flows from Arlington to Boston Harbor. The Charles River watershed extends into the southwest part of the town, including Poet's Corner and the Arlmont Village neighborhood. Arlington shares most of its water resources with neighboring communities, and all of its large waterbodies are located on near or on the town boundaries. Together, Arlington, its neighbors, and non-profit advocacy groups have collaborated to protect and improve the quality of their water resources.

1. Lakes, Ponds, and Reservoirs

Mystic Lakes. The Upper and Lower Mystic Lakes form Arlington's northeast boundary with Winchester and Medford. Each waterbody qualifies as a **Great Pond** under state law.[3] The Mystic Lakes are regionally significant waters that support a variety of fish, seasonal and migrating birds, and outdoor recreation such as swimming, boating, and fishing. State-owned park land provides public access to the water along the east shores of the Mystic Lakes, but access in Arlington is limited because most of the shoreline is privately owned. The Town owns three acres of conservation land on the Upper Mystic Lake.

Spy Pond. Spy Pond, also a state-designated Great Pond, is located by Arlington's southeast boundary with Belmont. Part of the headwaters of Alewife Brook, Spy Pond supports a limited fish population and it is an important seasonal resting and feeding area for migrating birds. According to the Natural Heritage and Endangered Species Program (NHESP), Spy Pond has ecological

[3] "Great Pond" is a pond or lake that contained more than 10 acres in its natural state, or a waterbody that once measured 10 or more acres in its natural state, but which is now smaller. Ponds or lakes classified as Great Ponds trigger Chapter 91 licensing requirements for piers, wharves, floats, retaining walls, revetments, pilings, bridges, and dams, and waterfront buildings constructed on filled land or over water. See Mass. Department of Environmental Protection (DEP), Wetlands and Waterways, Massachusetts Great Pond List.

significance as aquatic core habitat and a natural landscape that supports at least one Species of Special Conservation Concern (Engelmann's Umbrella-sedge).[4] It is also a popular recreational spot for fishing, boating, bird watching, and ice skating, although public access to the pond is limited to several paths and Spy Pond Park. The Arlington Boys and Girls Club, located on the northwestern shore, uses Spy Pond for summer boating programs.

Spy Pond is a beloved community resource with well-organized advocates, e.g., the Spy Pond Committee and Friends of Spy Pond Park, Inc. Over the past decade, and the Town has made improvements at Spy Pond and within Spy Pond Park, including major park improvements in 2005 and a joint project with the Appalachian Mountain Club Trail Team to reconstruct the path system. In addition, the Town has been working with consultants to remove invasive and nuisance plant species and replace them with native vegetation along the shoreline.[5] Water quality and environmental degradation of Spy Pond is an ongoing concern, and the Town has received state assistance with environmental remediation efforts.

Hill's Pond (Menotomy Pond). Located in Menotomy Rocks Park, Hill's Pond is a 2.6-acre man-made waterbody that provides habitat for common species of fish, frogs, and insects. Accessible by a footpath from Jason Street, Hill's Pond offers scenic vistas and recreational opportunities for fishing and bird watching, and ice skating during the winter months. In the mid-1990s, Arlington completed an award-winning improvements project that involved draining, dredging, and redesigning the pond. More recently (2007), the Town installed aerators to improve water quality and regraded and edged the pond to minimize erosion and run-off. Hill's Pond is monitored, tested, and treated for invasive plant species each year.

Arlington Reservoir. The 65-acre Arlington Reservoir is located at Arlington's western border with Lexington. It served as Arlington's public water supply from the early 1870s until the Town joined the then-new Metropolitan Water District (now the MWRA) in 1899. Only half of the Reservoir's surface area lies within Arlington, but the entire perimeter is owned by the Town and managed by the Arlington DPW and Park and Recreation Commission. The Arlington Reservoir Committee, a subcommittee of Vision 2020, provides advocacy for Arlington Reservoir's water quality and surrounding landscape.

The Arlington Reservoir supports diverse wildlife habitat and includes Arlington's largest collection of aquatic species. It also serves as a recreational resource, with a mile-long walking trail and swimming at Reservoir Beach, a sandy beach on the eastern shore. The Town has made some improvements at Reservoir Beach, including the installation of an access ramp for people with disabilities. An earthen dam along the southern edge maintains the Arlington Reservoir's water level. Water can be released into the Mill Brook by way of a sluice gate in the dam. In 1999, the state notified Arlington that the dam was failing and must be repaired in order to protect downstream properties. Town officials, engineers, and members of Vision 2020 collaborated to

[4] NHESP, BioMap 2 Arlington Report (2012).

[5] Aquatic Control Technology, Inc., to Arlington Department of Public Works, "2012 Aquatic Management Program - Arlington, MA, Spy Pond, Arlington Mill Reservoir and Hills Pond" (undated).

design a plan that would protect public safety, preserve and enhance recreation facilities, and protect the wooded landscape around the Reservoir.

2. Rivers and Brooks

Mystic River. The Mystic River is a regional resource that provides recreational and scenic benefits as well as habitat for several species of birds. It begins in Reading as the Aberjona River, which discharges to the Mystic Lakes in Arlington and Winchester. From the Lower Mystic Lake, the Mystic River flows through Medford, Somerville, Everett, Charlestown (Boston), and Chelsea until it merges with the Chelsea River and empties into Boston Harbor. One of five sub-watersheds of the much larger Boston Harbor watershed, the Mystic River watershed is urban and densely populated, and it has significant environmental challenges.

The Mystic River is historically significant as the site of industrial and maritime activities during the eighteenth and nineteenth centuries. This industrial legacy has contributed to the river's water quality problems. Several organizations have worked to improve water quality and educate the public about the Mystic River's ecological and public health significance to the region. Formed in 1972, the non-profit Mystic River Watershed Association is dedicated to restoring and protecting the river, organizing stewardship programs, promoting public access, and monitoring and clean-up activities. A more recent endeavor, the EPA's Mystic River Watershed Initiative (2009), is a partnership of federal, state, and local agencies, non-profit organizations, and U-Mass Boston to improve environmental conditions in the Mystic River and its tributaries, support marine science research, protect open space, and provide public access to the water.[6]

Mill Brook. The Mill Brook flows from west to east across town, roughly parallel to Massachusetts Avenue from the Arlington Reservoir to Arlington Center, where it turns northward toward the Lower Mystic Lake. It functions as part of a larger drainage system that transports water from Great Meadows in Lexington to the Arlington Reservoir, along the Mill Brook to the Mystic River, and ultimately to Boston Harbor. As the water source for several mills and mill ponds during the eighteenth and nineteenth century, the Mill Brook is a significant cultural landscape with an inextricable link to Arlington's industrial past. Today, much of the Mill Brook is channeled, with segments running through underground culverts and only limited views to the exposed sections of the waterway. Access points exists in several town-owned parks and cultural sites, including Meadowbrook Park, Mt. Pleasant Cemetery, Cooke's Hollow Conservation Area, Wellington Park, the Old Schwamb Mill, Hurd Field, and the Arlington Reservoir. In 2010, the Town prepared a feasibility study for a linear park abutting the Mill Brook. Arlington requires all new development along the Mill Brook to provide public access to the waterway.

Alewife Brook. A Mystic River tributary, the Alewife Brook forms Arlington's eastern boundary with Cambridge. It is located within the state-owned Alewife Brook Reservation, a 120-acre conservation area that is one of the region's largest urban parks. Managed by the Department of Conservation and Recreation (DCR), the Alewife Brook Reservation includes land in Arlington,

[6] U.S. Environmental Protection Agency, *Mystic River Watershed Initiative* (undated publication).

Cambridge, and Somerville. In 2012, DCR completed the Alewife Greenway Bike Path Connector, a $3.8 million dollar federally funded project to develop a paved path along the Alewife Brook. The Alewife Brook continues to be the site of significant flooding concern for neighborhoods in East Arlington, Belmont, and Cambridge. Its urban setting and surrounding land use patterns make the Alewife Brook highly vulnerable to flooding, combined sewer overflows (CSOs), and high nutrient saturation.[7] There is concern in Arlington that large-scale development projects proposed or recently completed near the Alewife Brook could exacerbate the area's flooding problems.

D. Wetlands

Wetlands perform basic functions such as flood storage, flood damage control, pollution filtration, and groundwater recharge, all of which affect water quality. They are also essential habitat for many birds, animals, insects, and native plants, whether common, threatened, or endangered. In Arlington, wetlands can be found in scattered sites along the Alewife Brook, around Spy Pond, Hill Pond, and the Arlington Reservoir, at Meadow Brook Park and the Mugar Property, and in several sites in the northwest corner of town near Reed's Brook. Most of the mapped wetlands in Arlington are shallow marshes and shrub swamps bordering a waterbody, river, brook, or stream.

Wetlands are sensitive, scenic, and ecologically valuable resources. The regulations that protect them comprise some of the strongest controls over land development in Massachusetts. Wetlands protection laws and regulations do not directly control land use, but they do affect where construction can occur, how construction activities can be carried out, and what types of mitigation may be required for construction near wetland resource areas. Wetland impacts are regulated by the federal Clean Water Act, the Massachusetts Wetlands Protection Act (WPA), the Massachusetts Rivers Protection Act, and the Town of Arlington's Wetlands Protection Bylaw and Regulations. The Clean Water Act requires a permit for dredging or filling of any "waters of the United States," including most wetlands. The Massachusetts WPA prohibits adverse impacts on wetlands and riverfront areas and regulates activity within 100 feet of these and other resource areas. Arlington's local wetlands bylaw imposes some additional restrictions. Any development proposal that affects wetlands must obtain approval from the Arlington Conservation Commission and may also require approval from the Massachusetts Department of Environmental Protection (DEP).

E. Floodplains

Several areas in Arlington experience major flooding problems every few years, including the areas around Reed's Brook, Mill Brook, Alewife Brook, and the Mugar Property. The Federal Emergency Management Agency (FEMA) released new floodplain maps for Arlington in 2010. Virtually all of Arlington's easterly boundary – from the Mystic Lakes to the Mystic River, the Alewife Brook, and Spy Pond – falls within federally designated floodplains (Map 7-2). The Arlington Reservoir and portions of the Mill Brook are also in floodplains. Since construction in a floodplain is strictly regulated, changes to floodplain boundaries may have an impact on future development not only within Arlington but the greater flood-prone region along the Alewife Brook. Several years ago,

[7] Blankenship, et al., *Quality and Quantity: Stormwater Management in Alewife Brook* (Tufts University WSSS and Mystic River Watershed Association, 2011), 9.

Arlington and its neighbors formed the Arlington-Belmont-Cambridge (ABC) Tri-Community Group to address flooding in the Alewife Brook watershed and to monitor combined sewer overflows (CSOs) along the brook.

F. Vegetation

Vegetation reveals much about a community's soil conditions, climate, and density of development. Trees and plants play a critical role in the hydrologic cycle, stormwater management, heat management, adaptation to climate change, and clearly, quality of life. Despite Arlington's urban development, it still has several small wooded areas: Menotomy Rocks Park, Turkey Hill, Mount Gilboa, the Arlington Reservoir, portions of the Symmes property, and the Crusher Lot. According to the Town's *Open Space and Recreation Plan*, these woodlands include White Ash, several species of Oaks and Hickories, White Pine, Sassafras, Staghorn Sumac, Grey and Paper Birches, and more limited examples of Sugar Maple, Black Cherry, and Linden trees. Native shrubs and plants found in these woodland areas include Blueberry, Currant, Dangleberry, Deerberry, Maple Leaf Viburnam, Whorled Loosestrife, and False Solomon's Seal.[8]

Arlington's waterways are home to numerous species of native trees, bushes, and plants that thrive in wet soils. These include Green Ash, Silver, Red, and Ashleaf Maples; Cottonwood; and Willow trees. Cattail, Silky and Red Osier Dogwoods, and Buttonbush are also commonly found. Reed pads and aquatic weeds can be found in and around the town's waterbodies, including Mystic Lake and Spy Pond.[9]

The Town encourages landscaping and gardening with native plants. For example, the Department of Public Works (DPW) uses native species in its landscaping work, and the Conservation Commission publishes a list of native plants as a guide for property owners and developers. As part of the Arlington Reservoir dam reconstruction project, the Town installed a new Wildlife Habitat Garden, planted with native shrubs, trees, and perennials.[10] The Town also used native plant species in new rain gardens at Spy Pond, Hardy School, and Hurd Field, which are designed to collect, absorb, and clean stormwater runoff.

Invasive Plant Species. Numerous species of non-native and invasive trees, shrubs, and plants exist throughout Arlington. An **invasive species** is defined by the National Invasive Species Council as "… an alien (or non-native) species whose introduction does, or is likely to cause economic or environmental harm or harm to human health."[11] Non-native species in Arlington include Norway and Sycamore Maples, Tree-of-Heaven, and Mountain Ash trees, as well as Common and European Buckhorns, Forsythia, Winged Euonymus, some Honeysuckles, Multiflora Rose, Oriental Bittersweet, Barberry, and Japanese Knotwood shrubs. Purple Loosestrife, Phragmites

[8] *Open Space and Recreation Plan Update 2007-2012* (2007), 54-59.

[9] Ibid.

[10] Arlington Reservoir Committee, "Wildlife Habitat Garden," http://www.arlington2020.org/reservoir/Habitat_Garden.htm.

[11] National Invasive Species Council, http://www.invasivespecies.gov.

reed, and water chestnut are also found in and near many of the town's wetlands and waterbodies. All of these are fairly typical of the invasives found in Massachusetts cities and towns.

Arlington tries to control and remove invasive plants and aquatic weeds at its conservation lands, including the water chestnut growing at the Arlington Reservoir and Spy Pond.[12] The Mystic River Watershed Association has also worked to remove water chestnut from the Mystic River. Water chestnut, which grows in dense floating mats, limits the amount of light that can reach below the water's surface. It reduces oxygen levels in the water, increases the potential for fish kills, and limits recreational activities such as boating, fishing, and swimming.[13]

G. Environmental Hazards

Arlington's environmental hazards include hazardous waste sites, stormwater runoff and drainage control, and wetland enforcement matters. Map 7-3 identifies the environmental hazards for which specific geographic information is known.

1. Hazardous Waste Sites

The Massachusetts DEP Bureau of Waste Site Cleanup regulates the identification, assessment, and remediation of contaminated sites, known as Disposal Sites under the Massachusetts Contingency Plan (MCP) regulations. According to the DEP's Reportable Release Lookup table, there have been 193 reported disposal incidents in Arlington since 1987.[14] The vast majority of incidents reported to DEP were relatively minor or low risk, involving a response that did not require oversight by DEP or a Licensed Site Professional (LSP). Seven incidents are "Tier classified," however, meaning a type or an extent of contamination that poses a higher risk to the public. Arlington has no Tier 1A (highest risk) sites, but there are two Tier 1D sites and five Tier 2 sites, as shown in Table 7.2. Tier 1D is a default classification that DEP assigns when the responsible party misses a regulatory deadline, e.g., failing to file a report. Tier 2 sites warrant clean-up under LSP supervision, but they do not involve a high enough risk to require a DEP permit.

Table 7.2. Contamination Sites by Chapter 21E Tier Status

Site Name	Address	Contamination Type	Chapter 21E Status
Arlington High School	869 Massachusetts Ave.	Hazardous Material	Tier 1D
Dry Cleaners	1092 Massachusetts Ave.	Not Identified	Tier 2
Former Arrow Pontiac	25 Massachusetts Ave.	Not Identified	Tier 2
Residential Group Home	44 School St.	Oil	Tier 2
Mile Marker 132	Route 2 West	Oil	Tier 1D
MBTA Bus Station	1389 Massachusetts Ave.	Oil and Hazardous Material	Tier 2
TD Bank	880 Massachusetts Ave.	Hazardous Material	Tier 2

Sources: MassGIS, Chapter 21 Database, and Dept. of Environmental Protection, Reportable Release Lookup, September 2013.

[12] See Aquatic Control Technology, Inc., to Arlington DPW, 2012 Report.

[13] U.S. Department of the Interior, National Park Service, "Aquatic Plants: Water Chestnut," http://www.nps.gov/plants/alien/pubs/midatlantic/trna.htm.

[14] MA DEP, "Waste Sites and Releases: Arlington," http://public.dep.state.ma.us/SearchableSites2/Search.aspx.

The *Open Space and Recreation Plan* reports that in addition to the sites reported in Table 7.2, two other contaminated properties have required remediation. The Reed's Brook site (northwest Arlington) served as the Town's landfill from 1959 to 1969. The site underwent a Comprehensive Site Assessment as part of the landfill closure process and it was eventually redeveloped as McClennen Park in the 1990s. The former Symmes Hospital property, which the Town purchased and later sold to a developer, was remediated by the buyers as part of a large-scale redevelopment project. The Town discovered two contaminated areas on the site before purchasing it.

DEP has identified six sites in Arlington that are subject to Activity and Use Limitations (AUL): remediated (and sometimes unremediated) sites that can be used for new purposes, subject to restrictions recorded with the deed. For example, the playing field at Arlington Catholic School can be used for an athletic field and accessory purposes, but not for construction of a residence or business. The AUL sites in Arlington are reported in Table 7.3.

Table 7.2. Sites Subject to Activity and Use Limitations under Chapter 21E

Site Name	Address	Status	RAO Class	AUL Date
Arlington Catholic Playing Field	Summer St.	RAO*	B2†	2009-11-19
MBTA Parking Lot	1395-1425 Massachusetts Ave.	INVSUB**		2002-07-24
Brighams, Inc. Brighams, East Edge of Parking Lot	30 Mill St.	RAO	A2‡	2012-04-04
Unnamed Site	24 Central St.	RAO	A3§	1998-05-01
Unnamed Site	1386 Massachusetts Ave.	RAO	B2	2002-10-03
Unnamed Site	180 Mountain Ave.	RAO	A3	2012-10-15

Source: MassGIS.
Notes:
*RAO means "Response Action Outcome," or a report filed with DEP that actions taken have eliminated substantial hazards and no significant risk exists on the site.
**INVSUB means the RAO filed with DEP is invalid.
†Class B2: no remedial action required if AULs are implemented.
‡Class A2: Permanent solution achieved, but some contamination remains.
§Class A3: Permanent solution achieved; but some contamination remains; AULs have been implemented.

2. Non-Point Source Water Pollution

Another source of environmental concern is **non-point source water pollution**—pollution that originates from diffused or widespread sources and enters surface water and groundwater through stormwater runoff. Non-point source pollutants include:

- Excess fertilizers, herbicides, and insecticides from lawns and farmland;
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites and eroding stream banks; and
- Bacteria and nutrients from pet wastes.

These pollutants have harmful effects on drinking water supplies, recreation, and fisheries and wildlife. Identifying and controlling the source of pollutants such as a leaking underground oil tank or the leaching of fertilizer into a waterbody is much more difficult than point source

pollution. The most important ways to control non-point source pollution are through proper land management, effective maintenance of petroleum, and zoning or erosion control bylaws, particularly in sensitive areas. All of Arlington's waterbodies are threatened by nonpoint pollution due to untreated stormwater runoff from roadways, houses, and businesses. Stormwater runoff is accelerating the process of eutrophication and in the case of Spy Pond, creating a sandbar.

3. Water Quality Standards

The federal Clean Water Act (CWA) requires all fifty states to assess the quality of surface waters every two years and identify waterbodies with significant water quality impairments. The water quality standards that guide these biannual assessments are set by each state (subject to EPA approval). State water quality standards are based on the designated uses for a given waterbody and criteria (physical, chemical, and biological) to protect those designated uses. All of the waterbodies in Arlington are designated as Class B waters, or water suitable for "habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation ... Class B waters shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses. These waters shall have consistently good aesthetic value."[15] Though designated for these purposes, the waterbodies in Arlington do not actually meet Class B surface water quality standards.

As illustrated on Map 7-3, DEP has classified almost all of the ponds, lakes, rivers, and named brooks in Arlington as "Category 5" impaired waters under the CWA. As Category 5 waters, they require a **Total Maximum Daily Load** (TMDL) in order to restore them to meet surface water quality standards for Class B waters. The causes of each Category 5 impairment vary somewhat by waterbody, but they include both point and non-point sources of pollution. According to DEP's most recent CWA report to the U.S. Environmental Protection Agency, TMDLs have not yet been established for any of these waterbodies.[16]

WHAT IS TMDL?
Total Maximum Daily Load (TMDL) is an estimate of how much of a pollutant, or group of pollutants, a waterbody (lake, pond, river, stream, or estuary) can absorb without becoming polluted … TMDLs are developed for a pollutant (or a group of pollutants) in waterbodies that are listed in each state's list of impaired waters, known as the 303(d) list.
-U.S. Environmental Protection Agency

- **Spy Pond** has been the subject of environmental concerns for several decades. In 2001, the Town received a Lake and Pond Watershed Restoration grant from the state as well as a Section 319 Non-Point Source (NPS) grant. The NPS grant provided funds to install stormwater management measures to address the more than forty storm drains allowing excess phosphorus from lawn fertilizers and road salt and sand to enter the pond. For the past three years, Spy Pond was one of five waterbodies in Massachusetts tested weekly by the

[15] Code of Massachusetts Regulations (CMR) 314: 405(b).

[16] Massachusetts Department of Environmental Protection (DEP), *Massachusetts Year 2012 Integrated List of Waters* (January 2012), 142-145.

Department of Public Health (MDPH) to identify harmful algae blooms (HABs) as part of a grant from the Centers for Disease Control (CDC).[17] The Massachusetts Department of Transportation (MassDOT) recently installed Best Management Practices (BMP) devices to address runoff from Route 2 that was causing the formation of a sandbar in the pond. MassDOT also installed BMP devices to address runoff occurring from a Route 2 storm drain that was creating a large sandbar in the pond.[18] Nevertheless, while Spy Pond is state-designated as a Class B waterbody, it does not meet the Commonwealth's Class B water quality standards. Spy Pond remains impaired from causes such as chlordane, DDT, excessive algae growth, and phosphorous – all conditions that make it a Category 5 waterbody that requires a TMDL.[19]

- The **Mystic Lakes** suffer from nonpoint runoff from the Mystic Valley Parkway and lawn and yard maintenance. Aquatic weeds such as milfoil continue to be a concern in the lakes, causing both concerns to human safety and eutrophication of the waterbody. In the past, the Mystic Boat Club in Winchester has successfully applied aquatic pesticides to control weeds in its area of the Upper Mystic Lake. According to the *2012 Integrated List of Waters*, both the Upper and Lower Mystic Lakes qualify as Category 5 waters due to dissolved oxygen, and the Lower Mystic Lake is also impaired due to PCB found in fish tissue, salinity, chronic toxicity, DDT, and hydrogen sulfide.[20]

- The five-mile segment of the **Mystic River** that flows from Arlington to the Amelia Earhart Dam in Somerville/Everett is impaired by arsenic, chlordane, chlorophyll-a, DDT, dissolved oxygen saturation, *Escherichia coli* (*E. coli*), PCB in fish tissue, phosphorus (Total), and chronic toxicity. In annual self-assessments under MassDOT's NPDES Stormwater Management Plan, the agency estimates that the watershed of this five-mile segment consists of approximately 3,860 acres, 59.8 percent of which is impervious.[21]

- **Mill Brook** suffers from nonpoint source pollution and storm drain pollution all across the town. The principal cause of Mill Brook's impairment is *E. coli*.

- **Alewife Brook**, one of the most polluted waterbodies in Arlington, is adversely affected by combined sewer overflows (CSOs) from Cambridge, Somerville, and the MWRA system. Cambridge separated some of its combined drains recently, but overflows remain problematic. There are several reported causes of the Alewife Brook's Category 5 status, including copper, *E. coli*, foam and oil slicks, lead, dissolved oxygen, PCB in fish tissue, phosphorus, and chronic toxicity.

---

[17] Arlington Board of Health, http://www.arlingtonma.gov.

[18] Cori Beckwith, Conservation Administrator, Interview with Community Opportunities Group, Inc., August 1, 2013.

[19] DEP, *2012 Integrated List of Waters*, 144.

[20] Ibid.

[21] MassDOT, "Impaired Waters Assessment of Mystic River" (Segment MA71-02), 2012.

Arlington Reservoir faces nonpoint pollution problems from pesticides and fertilizers from a nearby farm and surrounding homes. Water chestnuts are also a problem that the Town tries to control by manual and mechanical harvesting during the summer.

H. Natural Hazards Response

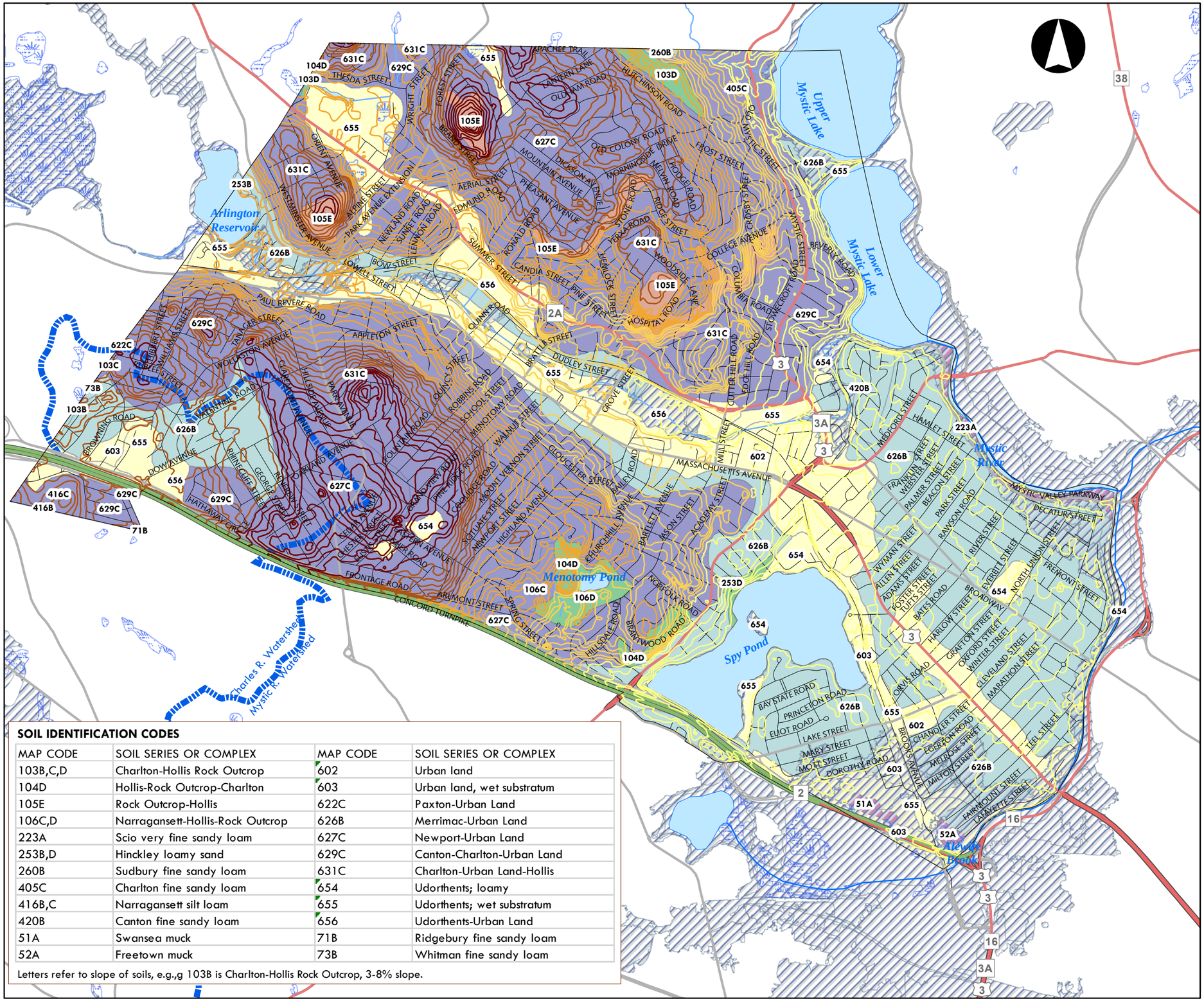
In recent years, Arlington has experienced both natural and human-caused disasters, e.g., hurricanes, blizzards, floods, and hazardous material spills. To help prepare for these events, Arlington established a Local Emergency Planning Committee, composed of municipal employees and community members. The Committee has developed a new Emergency Management Plan for the town, which focuses not only on preparedness and response but also mitigation and recovery.[22] It appears that Arlington does not yet have a Hazard Mitigation Plan, however, as required by the Federal Disaster Mitigation Act of 2000. The Metropolitan Area Planning Council (MAPC) is currently working with several communities in Greater Boston (including Arlington's neighbor, the City of Medford) to develop Hazard Mitigation Plans. "Hazard mitigation" involves long-term strategies, such as planning, changes in policy, educational programs, public works projects and preservation of floodplains and wetlands, to reduce or alleviate losses of life, injuries, and property resulting from natural hazards.

[22] Arlington Emergency Management Services, www.arlingtonma.gov/Public_Documents/ArlingtonMA_EMS/index.

ARLINGTON MASTER PLAN

Map 7-1. Topography and Soils

November 2013



SOIL IDENTIFICATION CODES

MAP CODE	SOIL SERIES OR COMPLEX	MAP CODE	SOIL SERIES OR COMPLEX
103B,C,D	Charlton-Hollis Rock Outcrop	602	Urban land
104D	Hollis-Rock Outcrop-Charlton	603	Urban land, wet substratum
105E	Rock Outcrop-Hollis	622C	Paxton-Urban Land
106C,D	Narragansett-Hollis-Rock Outcrop	626B	Merrimac-Urban Land
223A	Scio very fine sandy loam	627C	Newport-Urban Land
253B,D	Hinckley loamy sand	629C	Canton-Charlton-Urban Land
260B	Sudbury fine sandy loam	631C	Charlton-Urban Land-Hollis
405C	Charlton fine sandy loam	654	Udorthents; loamy
416B,C	Narragansett silt loam	655	Udorthents; wet substratum
420B	Canton fine sandy loam	656	Udorthents-Urban Land
51A	Swansea muck	71B	Ridgebury fine sandy loam
52A	Freetown muck	73B	Whitman fine sandy loam

Letters refer to slope of soils, e.g.,g 103B is Charlton-Hollis Rock Outcrop, 3-8% slope.

LEGEND

- Watershed
- Lakes and Ponds
- Rivers and Streams
- Wetlands
- Flood Plain

ROADWAYS

- Limited Access Highway
- Multi-lane Hwy, not limited access
- Other Numbered Highway
- Major Road, Collector
- Ramp
- Local Roads

SOILS (SLOPE)

- Urban Land (No Slope)
- 0-3%
- 3-8%
- 8-15%
- 15-25%
- 25-35%

Data Sources: Arlington GIS, MassGIS, MassDOT.

0 500 1,000 2,000 3,000 4,000 Feet

RKG

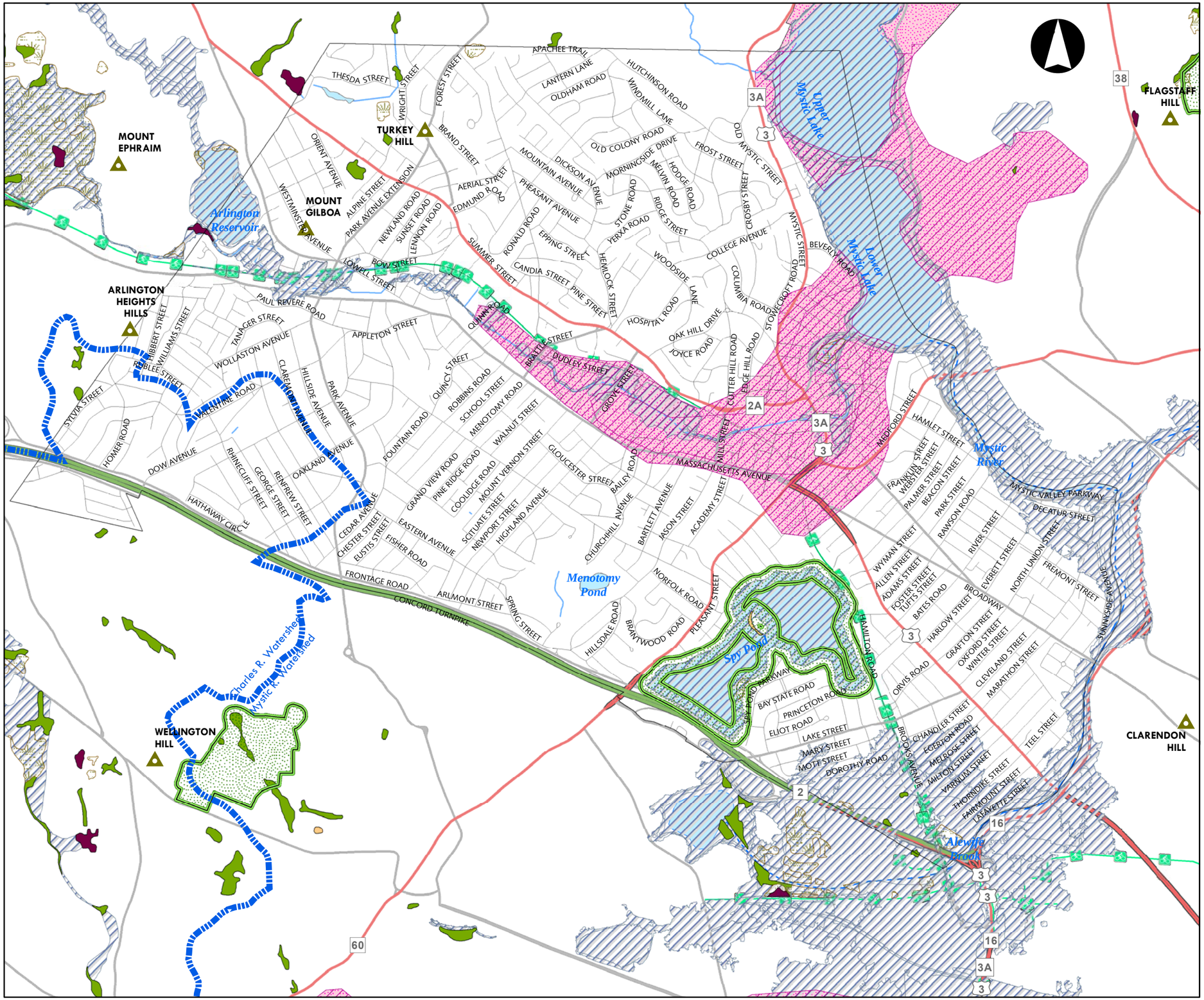
HOWARD/STEIN-HUDSON, INC.
GAMBLE ASSOCIATES
PPRI, INC.
COMMUNITY OPPORTUNITIES GROUP, INC.

This map is for general planning purposes only. The data used to create the map are not adequate for making legal boundary determinations. Exercise caution when interpreting the information on this map.

ARLINGTON MASTER PLAN

Map 7.2. Wetland and Water Resources

November 2013



LEGEND

- Watershed
- Rivers and Streams
- Lakes and Ponds
- Flood Plain
- Aquifers
- Nonpotential Drinking Water (DEP)

WETLANDS

- Bog
- Deep Marsh
- Shallow Marsh
- Shrub Swamp
- Wooded Swamp; Deciduous
- Wooded Swamp; Mixed Trees
- NHESP/TNC BioMap2 Core Habitat

ROADWAYS

- Limited Access Highway
- Multi-lane Hwy, not limited access
- Other Numbered Highway
- Major Road, Collector
- Ramp
- Local Roads
- Minuteman Bikeway
- Significant Hills (Named)

Data Sources: Arlington GIS, MassGIS, MassDOT.

0 500 1,000 2,000 3,000 4,000 Feet

RKG

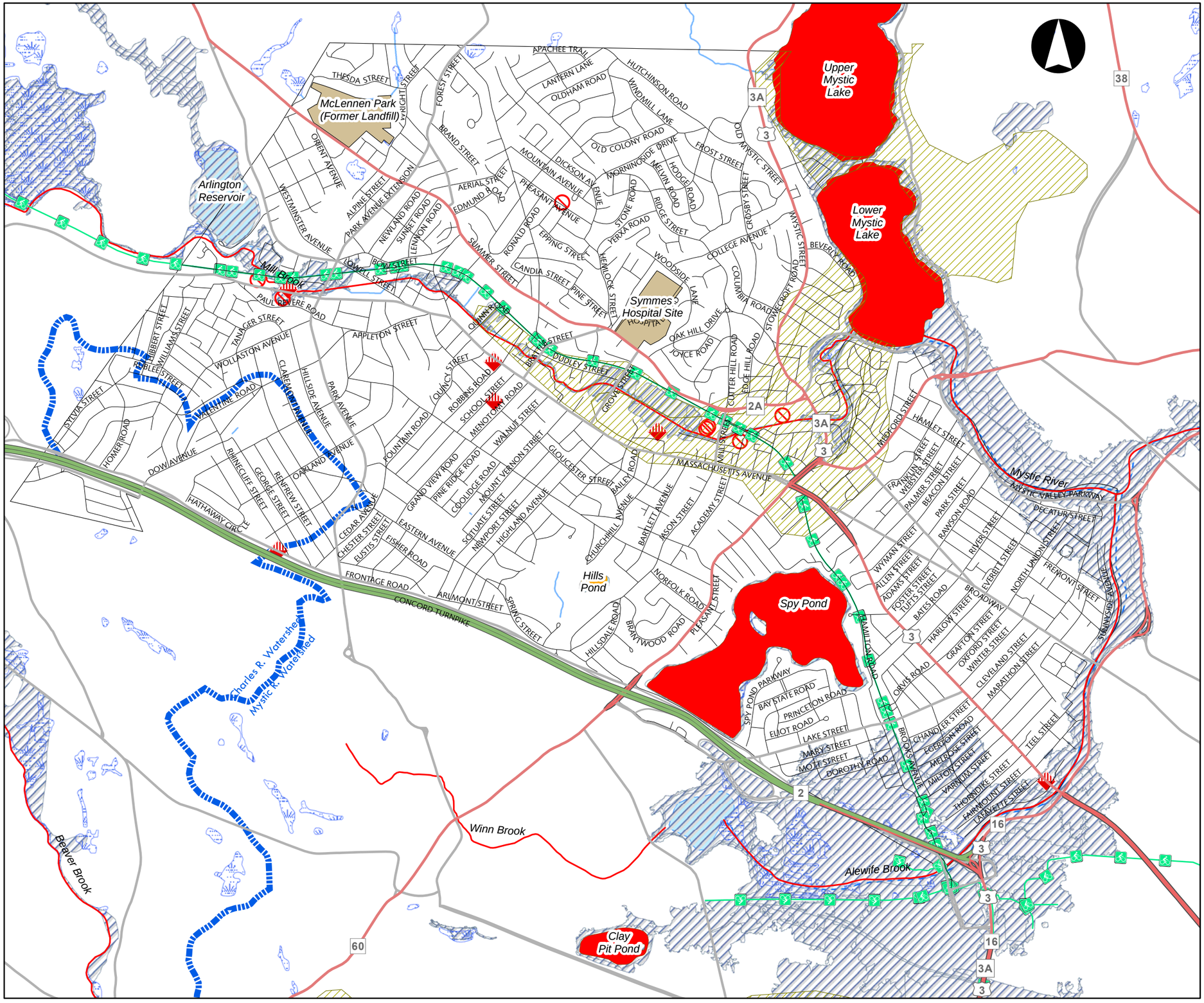
HOWARD/STEIN-HUDSON, INC.
GAMBLE ASSOCIATES
PPRI, INC.
COMMUNITY OPPORTUNITIES GROUP, INC.

This map is for general planning purposes only. The data used to create the map are not adequate for making legal boundary determinations. Exercise caution when interpreting the information on this map.

ARLINGTON MASTER PLAN

Map 7.3. Environmental Challenges

November 2013



LEGEND

- Watershed
- Lakes and Ponds
- Rivers and Streams
- Wetlands
- Flood Plain
- Chapter 21E Tier-Classified Sites
- AUL Sites
- Nonpotential Drinking Water (DEP)

Integrated List of Waters: Rivers, Brooks

Category

- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

Integrated List of Waters: Lakes and Ponds

Category

- 2 - Attaining some uses; other uses not assessed
- 3 - No uses assessed
- 4A -Impaired - TMDL is completed
- 4C - Impairment not caused by a pollutant
- 5 - Impaired - TMDL required

ROADWAYS

- Limited Access Highway
- Multi-lane Hwy, not limited access
- Other Numbered Highway
- Major Road, Collector
- Ramp
- Local Roads
- Minuteman Bikeway

Data Sources: Arlington GIS, MassGIS, MassDOT.

0 500 1,000 2,000 3,000 4,000 Feet

RKG

HOWARD/STEIN-HUDSON, INC.
GAMBLE ASSOCIATES
PPRI, INC.
COMMUNITY OPPORTUNITIES GROUP, INC.

This map is for general planning purposes only. The data used to create the map are not adequate for making legal boundary determinations. Exercise caution when interpreting the information on this map.